THE SOCIAL MOTIVE IN THE TEACHING OF ARITHMETIC

W. C. REAVIS

Harris Teachers College, St. Louis, Missouri

During the past year the writer and Miss Irene M. Kiser, departmental teacher of arithmetic in the Pierre Laclede School of St. Louis, used the following plan in teaching stocks and bonds to an eighth-grade class. The purpose of the plan was to vitalize a phase of the work in arithmetic that ordinarily offers great difficulty to pupils, by making use of a project that appealed to the social motive.

A mock bank was organized, in which each member of the class studying stocks became a stockholder. Certificates of stock and other commercial forms connected with banking were worked out and printed on the school press. These certificates were then sold in different denominations to the different members of the class. This stock was sold at market quotations which were listed on a bulletin board by officials at different times during the recitation. The pupils thus became conversant very quickly with the terms used in stock transactions and understood the effect of changes in prices on the value of their personal stock already purchased.

Problems in buying and selling were next undertaken by the class, and the results worked out first for the individual directly concerned in the transaction and then for the corporation. The newspaper quotations were carefully noted in this connection, and hypothetical problems were made up and discussed by the class. When purchases and sales were made and dividends or deficits declared, the appropriate commercial forms were used in completing the transaction. This afforded excellent practice in the use of conventional forms, such as deposit slips, checks, and notes.

The following general cases were worked out inductively by the class through participation in the various transactions:

Case I.   To find the income from a certain number of shares of stock paying certain annual or semiannual dividends.

Case II.   When money is worth a certain percentage, to find the profits of the investment on a certain number of shares paying certain dividends (*a*) when bought at par, (*b*) above par, (*c*) below par.

Case III.   To find the dividends that can be declared on certain net earnings of a corporation.

Case IV.   To find the value of stock bearing certain per cent dividends, when the amount of dividends is known.

Case V.   To find the rate of income on the investment.

Case VI.   To find the rate of assessment to make up a certain deficit resulting from losses to the corporation.

Case VII.   To find the price one can afford to pay for stocks paying certain dividends, in order to realize certain profits on the investment.

Case VIII.   To find the net profits on stock paying certain dividends, after deducting rate of taxation.

In the teaching of bonds, officers were chosen by the class to represent the board of education, and these submitted a proposed bond issue for school purposes to the members of the class, who represented the voters of the city.   After the proposition was approved by the voters, the kind of issue, rate of interest the bonds should bear, the length of time for maturing the bonds, and the probable market value of the issue were discussed.   Sample bonds were brought in and examined by the class, and it was finally decided to float a serial issue that could be matured in ten years.   A form was then prepared and printed, the coupons dated, and the rate of interest fixed before the bonds were offered for sale to the members of the class.

The following cases were then developed inductively as in the case of stocks:

Case I.   Find the cost of certain bonds bought at par, above par, or below par.   Purchase made through a broker.

Case II.   Find the rate of interest actually received on money invested in certain bonds bearing a certain rate of interest, when bought at, above, or below, par.

Case III.   Find the annual income expected from the purchase of a certain number of bonds bearing a certain rate of interest, when bought at, above, or below, par.

Case IV.   Which are more profitable, bonds bearing a certain rate of interest bought at, above, or below, par; or bonds bearing a lower rate of interest bought below par?

Case V. Assuming that money is worth a certain percentage, what can one afford to pay for bonds bearing a certain rate of interest?

Case VI. Find the amount that must be invested in bonds bearing a certain rate of interest to yield a certain annual income.

In order to measure the results of this work, it was decided to give as a test the ten following problems in stocks taken from p. 194 of the *Stone and Southworth Arithmetic*, Book III. The time was arbitrarily set at twenty-five minutes, and work stopped when time was called.

1. What is the market value of 35 shares of North Western stock at $43\frac{1}{2}$ per cent above par?

2. What would be the value of the same stock if sold at the same rate below par?

3. I receive a stock dividend of $1,728. This is at the rate of $14\frac{2}{5}$ per cent on the par value of my investment. How much of the stock do I own?

4. A man exchanges 170 shares of stock worth 103 in the market for a cottage at the seaside valued at $8,510. The difference was made up in mill stock at a par value of 50 per share. How many shares were there? Leave brokerage out of the account.

5. A gentleman bought 1,200 shares of railroad stock at 115, and was glad to sell it at 58. What did he lose?

6. The Atlantic Steamship Company is capitalized at $8,000,000. The receipts for the year are $16,400,000. The expenses are $14,800,000. $600,000 is put into a reserve fund, and the remainder distributed as a dividend. What rate per cent of dividend was declared?

7. How many hundred-dollar shares of mining stock can be bought at 118 for $3,750, and what sum will remain? (Parts of a share are not sold.)

8. I receive $2,133 as the net profits of stock bought at par and sold at 107. How many hundred-dollar shares were sold, allowing $\frac{1}{4}$ brokerage?

9. My broker paid me $8,595 which he had received for Old Colony railroad stock sold for me at $\frac{1}{8}$ brokerage. How many shares did he sell at 215?

10. In the N.Y. stock market 50,000 shares of railroad stock were bought at a premium of $22\frac{1}{8}$, and sold the next day at a premium of $26\frac{3}{4}$. The brokerage in each case being $\frac{1}{8}$, required, the profits.

The class work was completed March 15, 1917, and the foregoing test was given March 16. There were 22 pupils in the class. Of these 21 were present and took the test. Fifteen pupils worked all the problems correctly in twenty-five minutes, 2 pupils had nine right out of nine attempted, 1 pupil had eight right out of nine attempts, and 3 had seven right out of seven attempts.

The same test was given on the opening day of school, September 5, 1917, to the same class following an interval of 90 days of school during which time no attention was given to the work in stocks and bonds, and a vacation of 80 days. Of the 15 pupils who had ten right out of ten attempts, 13 again made perfect scores in the same time, 1 fell to eight rights out of eight attempts, and 1 was not present to take the test. One pupil raised his score from seven rights out of seven attempts, to nine right out of nine attempts, 1 from seven rights out of seven attempts to eight rights out of eight attempts, 1 from eight rights out of nine attempts to nine rights out of nine attempts, 1 retained a record of seven rights out of seven attempts, 1 changed from nine rights out of nine attempts to nine rights out of ten attempts, and 1 who was absent when the first test was given took the later test and worked nine right out of nine attempts.

<div align="center">SUMMARY</div>

Problems Attempted	Problems Right	Pupils First Test	Pupils Second Test
10	10	15	13
10	9	0	1
9	9	2	4
9	8	1	0
8	8	0	2
7	7	3	1

The results given in the foregoing table are offered as an example of the thoroughness and persistency of learning with one class when the work presented was made real and concrete, and the method provided group activity in which the social motive was very pronounced. In this connection I desire to call the attention of city teachers especially to the unlimited possibilities for similar purposeful work in much of the arithmetic offered in our city schools. Projects related to handwork, household arts, elementary science, games, the administration of the school, community problems, work growing out of conventional business forms, etc., may be found in abundance, and may be used to vitalize the work through the appeal they make to social motives and group activities.